



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,529	01/31/2005	Kenji Takai	1204.44255X00	1181
20457 7590 07/25/2007 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER LAM, CATHY FONG FONG	
			ART UNIT 1775	PAPER NUMBER
			NOTIFICATION DATE 07/25/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

officeaction@antonelli.com  
dprater@antonelli.com  
tsampson@antonelli.com

**Office Action Summary**

Application No.

10/506,529

Applicant(s)

TAKAI ET AL.

Examiner

Cathy Lam

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,7,10,11,13,15-17,19,21,22,25,26,28,30-34,41-44 and 51-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4-26-06, 2-13-07, 3-19-07.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

**Continuation of Disposition of Claims: Claims pending in the application are 1,2,4,6,7,10,11,13,15-17,19,21,22,25,26,28,30-34,41-44 and 51-54.**

In view of the amendment and remarks filed on April 23, 2007, the pending claims continue to be unpatentable as following:

***Information Disclosure Statement***

The Foreign Patent Documents EP 0957664 and WO 97/47165 have been considered.

***Claim Rejections - 35 USC § 103***

1. Claims 1, 2, 4, 6-7, 10-11, 13, 15-17, 19, 21-22, 25-26, 28, 30-34, 41-44 and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ameen et al (US 6132589) or Fujiwara et al (EP 1006763 A2).

Ameen teaches a copper foil that is useful for the production of printed circuit boards. The copper foil has a smooth or shiny side and a rough or matte side.

The copper foil disclosed by Ameen is an untreated foil, that is the surfaces of the copper foil has not undergone roughening treatment (col 3 L 18-23). Ameen's copper foil has a thickness of from about 0.0002 inch to about 0.02 inch (i.e. 5-500  $\mu\text{m}$ ) and has a very low profile surface (col 2 L 43-44 & L 60-63).

A zinc metal layer is first coated over the copper foil, followed by a chromate layer, both layers function as anti-corrosive layer (col 2 L 50-54). A layer of silane coupling agent is applied to the chromate layer, wherein the silane coupling agent may contain amino group (col 5 L 19-26).

The coated copper foil is brought into contact with a dielectric substrate which is a partially cured prepreg. The resin used for the prepreg can be an epoxy resin or a cyanate ester (col 6 L 47-59). The epoxy resin is typically a liquid unless curing step is

Art Unit: 1775

performed (col 8 L 57-62). The epoxy resin may include a conventional amine curing agent or a curing agent other than amine (col 6 L 50-54 & 60-63).

Fujiwara also teaches a copper foil laminate for used in a printed wiring board. The copper foil is a rolled copper foil (i.e. a smooth surface or no roughening treatment performed on its surfaces).

A bond enhancing treatment is performed onto the copper foil surfaces (page 4 L 16-21). The sequence of forming the bond enhancing treatment includes first forming an alloy layer (2) over the copper foil surface, then coating a chromate layer (3) over the alloy layer (2) followed by forming a silane coupling agent layer (4) (page 4 L 16-19 & page 5 L 29-30).

The alloy layer (2) is comprised of copper, zinc and nickel (page 4 ¶ 23). The examiner is taking the position that the alloy layer (2) and the chromate layer (3) are the claimed anti-corrosive coating layers. The silane coupling agent (4) containing amino group (page 5 L 32-33).

The copper foil that is coated with the anti-corrosive coating layers and the silane coupling agent, is then coated with an epoxy resin varnish (i.e. a liquid epoxy resin) (page 2 L 37-38 & page 11 L 29-30).

The bonding strength after heat pressing & drying of the copper foil laminate is > 0.6 kgf/cm (i.e. equivalent to 0.6 kN/m) (page 11 Table 1, Ex. 1 & 2).

Both Ameen and Fujiwara disclose the present invention except for the surface roughness and the thickness of the copper foil. The prior art are also silent about the copper foil which formed into a circuit pattern having a line width of 1 mm.

In view of the prior art teachings, it would have been obvious to choose a surface roughness and thickness for the copper foil because these variables can be obtained by rolling process. Ameen discloses that the copper foil having a "very low surface profile" may have a surface roughness of less than 4  $\mu\text{m}$  (col 2 L 62-63).

Furthermore, it would also be obvious to fabricate a 1mm width circuit line because it is just a matter of design choice.

Regarding to the interfacial roughness between the insulating resin composition layer and the metal foil, the examiner is taking the position that it would be inherent that the interfacial roughness would be the same as the metal foil surface roughness, because the resin composition layer is a liquid when applied to the metal foil surface, and the liquid would conform to the shape of the metal foil surface.

### ***Double Patenting***

2. Claims 1, 2, 4, 6-7, 10-11, 13, 15-17, 19, 21-22, 25-26, 28, 30-34, 41-44 and 51-54 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of copending Application No.

11/044,533. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are structurally and materially the same.

3. Claims 1, 2, 4, 6-7, 10-11, 13, 15-17, 19, 21-22, 25-26, 28, 30-34, 41-44 and 51-54 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 18-33 of copending Application No.

Art Unit: 1775

10/986,913. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are structurally and materially the same.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Response to Arguments***

4. Applicant's arguments filed on April 23, 2007 have been fully considered but they are not persuasive. Applicant traverses the art rejections and raises the issue that the prior art of record do not teach the copper foils have the claimed thickness.

In respond to the above issue:

Applicant has not shown any advantages of a copper foil that has a thickness of  $< 3 \mu\text{m}$  versus a copper film that has a thickness of about  $5 \mu\text{m}$  (as disclosed by Ameen). In regards to the bonding strength, Fujiwara even though does not specifically teach the copper foil thickness; yet the copper foil adhering to the substrate still meets the claimed bond strength.

The examiner is taking the position that the thickness of the copper foil is arbitrary and Ameen's structure with slightly thicker Cu foil and Fujiwara's copper foil laminate are clearly obvious over the present invention.

Regarding to the provisional obviousness type double patenting over US application numbers 10/986,913 and 11/044,533, the examiner is taking the position that claims in these application do not exclude any surface treatment and/or having more than one surface treatment. The present invention and the co-pending

Art Unit: 1775

applications although not identical in wordings, but clearly have the same scope of invention. Thus, filing a Terminal Disclaimer is required to obviate these Obviousness type double patenting rejections.

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1775

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Cathy Lam  
Primary Examiner  
Art Unit 1775

cfl  
July 19, 2007